

REMARKS

This Amendment is fully responsive to the non-final Office Action dated January 16, 2008, issued in connection with the above-identified application. Claims 1-16 were previously pending in the present application. With this Amendment, claims 1 and 3-16 have been amended; and claim 2 has been canceled without prejudice or disclaimer to the subject matter therein. No new matter has been added by the amendments made to the claims. Favorable reconsideration is respectfully requested.

The Applicants have provided herein a replacement abstract to correct minor informalities with regard to the original abstract.

In the Office Action, the drawings have been objected to for failing to comply with 37 CFR 1.84(p)(5). Specifically, the Examiner alleged that Figs. 1 and 14 include element 18, which is not described in the specification. However, the Applicants point out that element 18 shown in Figs. 1 and 14 is described in the Applicants' specification at least on page 10, line 25; page 12, line 28; and page 25, line 4. Accordingly, withdrawal of the objection to the drawings is respectfully requested.

In the Office Action, claims 1-16 have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite. Specifically, the Examiner noted that claims 1, 9, 15 and 16 recite the phrases "switching time slots," and "specified time slot," which the Examiner alleged is unclear. Additionally, the Examiner noted that claims 1, 9, 15 and 16 recite the phrase "switched to a time slot other than a specified time slot," and the Examiner alleged is unclear how one would switch to a time slot other than the next specified time slot.

The Applicants have amended the claims to clarify the meaning of the above phrases noted by the Examiner. Accordingly, withdrawal of the rejection to claims 1-16 under 35 U.S.C. 112, second paragraph, is respectfully requested.

In the Office Action, claim 16 has been rejected under 35 U.S.C. 101 as being directed to non-statutory subject matter. Specifically, the Examiner alleged that claim 16 is directed to a program that is not stored on a computer-storage medium or executed by a computer. Additionally, the Examiner alleged that it is unclear whether claim 16 is directed to a method or a program.

The Applicants have amended claim 16 to recite "a program stored on a computer-readable medium" and to clarify that the claim is directed to a program. Withdrawal of the rejection to claim 16 under 35 U.S.C. 101 is respectfully requested.

In the Office Action, claims 1-5, 8-12 and 15-16 have been rejected under 35 U.S.C. 103(a) as being unpatentable over D'Souza (U.S. Patent No. 6,052,707, hereafter "D'Souza") in view of Shibayama et al. (U.S. Publication No. 2004/0064817, hereafter "Shibayama").

The Applicants have amended independent claims 1, 9, 15 and 16 to further distinguish the present invention from the cited prior art. For example, claim 1, as amended, recites the following features:

“A task switching apparatus for switching execution of a task assigned to a time slot by switching time slots in a processor, comprising:

an assigning unit operable to assign, on a one-to-one basis, each of a plurality of first tasks to first time slots among a plurality of time slots within a period, and assign a plurality of second tasks different from the plurality of first tasks to a single second time slot among the plurality of time slots within the period; and

a time slot switching unit operable to switch time slots when an execution time of a task reaches an assignment time;

a task selecting unit operable to select at least one first task from the plurality of first time tasks assigned to the first time slots when said time slot switching unit switches a current time slot to a time slot other than the second time slot, and to select at least one second task from the plurality of second tasks assigned to the second time slot when the current time slot is switched to the second time slot,

wherein the at least one second task has a priority classification, and said task selecting unit is operable to select the at least one second task from among the plurality of second tasks according to the priority classification. (Emphasis added).

The features emphasized above are similarly recited in independent claims 9, 15 and 16. Specifically, claim 9 is an apparatus claim including a first and second generating unit, and a control unit having similar features of the assigning unit and task selecting unit of claim 1. Claims 15 is a method claim and claim 16 is a program claim, both of which recite steps directed to the features of the assigning unit and task selecting unit of claim 1. The features noted above in claims 1, 9 15 and 16 are fully supported by the Applicants' disclosure (see e.g., Figs. 1, 4 and 5).

The present invention, as recited in claims 1, 9, 15 and 16, is directed to improving the efficiency of tasks performed by a processor. Specifically, first tasks are assigned to time slots on a

one-by-one basis so that each of the first tasks are selected and completed at least once in a period. Additionally, second tasks are assigned to a single second time slot such that tasks assigned to the second time slot are completed or executed in accordance with their priority classification.

Therefore, based on the present invention (as recited in 1, 9, 15 and 16), a programmer can eliminate the need of assigning priorities for tasks requiring processing to be performed in series (e.g. first tasks) by classifying the tasks as a first type. In addition, a programmer has only to classify tasks, not requiring high processing performance, into a second type, and to set a priority for performing these tasks (e.g., second type). By doing so, the programmer can enjoy an advantageous effect of eliminating the operation of assigning priorities to all respective tasks, facilitating program design by improving processing performance, and increasing flexibility in program design.

In the Office Action, the Examiner relied on D'Souza in view of Shibayama for disclosing or suggesting all the features recited in independent claims 1, 9, 15 and 16. The Applicants maintain that D'Souza in view of Shibayama fails to disclose or suggest all the features noted above in independent claims 1, 9, 15 and 16 (as amended.)

Specifically, the Applicants maintain the D'Souza in view of Shibayama fails to disclose or suggest at least the following features recited in claims 1, 9, 15 and 16:

1. assigning on a one-to-one basis each of a plurality of first tasks to first time slots and assigning a plurality of second tasks to a single second time slot within a period; and
2. selecting at least one first task from the plurality of first time tasks assigned to the first time slot when a current time slot is switched to a time slot other than the second time slot, and to selecting at least one second task from the plurality of second tasks assigned to the second time slot when the current time slot is switched to the second time slot,
3. wherein the at least one second task has a priority classification, and is selected from among the plurality of second tasks according to the priority classification.

On the other hand, D'Souza discloses an operating system that combines preemptive scheduling with cooperative or non-preemptive scheduling. In the Office Action, the Examiner noted that D'Souza discloses that tasks are logically partitioned into groups of interdependent tasks. As described in D'Souza, these groups of tasks are preemptively scheduled such that each group of

tasks is given a time slot for running on a processor. In summary, as described in D'Souza, tasks are classified into groups of interdependent tasks, and assigned corresponding time slots (see e.g., col. 4, lines 34-35 and lines 50-52, and Fig. 5). Additionally, D'Souza selects, in the case where time slots are switched, a task belonging to a group assigned to the switched time slots (see e.g., Abstract).

However, D'Souza neither discloses nor suggests differentiating between a first task and a second task by assigning first tasks to corresponding first time slots within a period; and assigning second tasks different from the first type tasks to a single second time slot within the period. Instead, D'Souza appears to only disclose or suggest assigning task groups to a single time slot.

Additionally, although D'Souza discloses selecting a task belonging to a group assigned to a time slot, the reference fails to disclose or suggest selecting a first task assigned to a first time slot when a current time slot is switched to a time slot other than a second time slot; and selecting a second task assigned to a second time slot when the current time slot is switched to the time slot assigned to a second time slot. Instead, in D'Souza, all task groups are equal to each other and tasks in the groups are also handled equally.

Moreover, Shibayama fails to overcome the deficiencies noted above in D'Souza. Specifically, Shibayama discloses a parallel process execution method for distributing processing times at an arbitrary ratio for parallel tasks, and assuring a turn-around time for the processing (see e.g., paragraph [0012]). As described in Shibayama, a task is determined from among many tasks according to the priority of switching time of time slots, assigning processing time to a switched time slot for the time required for the task, and executing the tasks (see e.g., paragraphs [0010]-[0013]).

Although D'Souza discloses that tasks are determined based on a priority (similar to the second tasks of the present invention), the method in Shibayama is still significantly different from the present invention, as recited in claims 1, 9, 15 and 16. For example, Shibayama assigns each task to multiple time slots, while in the present invention (i.e., Claims 1, 9, 15 and 16), the second tasks are assigned to a single second time slot, and each first task is assigned, on a one-to-one basis, to first time slots.

In addition, since Shibayama is directed to assuring a turn-around time for the processing by distributing the processing time at an arbitrary ratio for parallel tasks, Shibayama cannot provide the advantageous effect of assuring the processing performance of first tasks in series and assuring

processing of second tasks according to the priority classifications, as in claims 1, 9, 15 and 16.

Based on the above discussion, D'Souza and Shibayama fail to disclose or suggest at the least the following features similarly recited in claims 1, 9, 15 and 16 (as amended):

1. assigning on a one-to-one basis, each of a plurality of first tasks to first time slots and assigning a plurality of second tasks to a single second time slot within a period; and
2. selecting at least one first task from the plurality of first time tasks assigned to the first time slots when a current time slot is switched to a time slot other than the second time slot, and to selecting at least one second task from the plurality of second tasks assigned to the second time slot when the current time slot is switched to the second time slot,
3. wherein the at least one second task has a priority classification, and is selected from among the plurality of second tasks according to the priority classification.

Accordingly, independent claims 1, 9, 15 and 16 (as amended) are not anticipated or rendered obvious by D'Souza and Shibayama (individually or in combination) for at least the reasons noted above. Additionally, dependent claims 3-5, 8 and 10-12 are not anticipated or rendered obvious by D'Souza and Shibayama (individually or in combination) based at least on their respective dependencies from independent claims 1 and 9.

In the Office Action, claims 6 and 13 have been rejected under 35 U.S.C. 103(a) as being unpatentable over D'Souza and Shibayama, and further in view of Goldick (U.S. Publication No. 2003/0093457, hereafter "Goldick"); and claims 7 and 14 have been rejected under 35 U.S.C. 103(a) as being unpatentable over D'Souza, Shibayama and Goldick (U.S. Publication No. 2003/0093457, hereafter "Goldick"), and further in view of Hoogerbrugge (U.S. Publication No. 2006/0069738, hereafter "Hoogerbrugge").

Claims 6 and 7 depend from independent claim 1; and claims 13 and 14 depend from independent claim 9. As noted above, D'Souza and Shibayama fail to disclose or suggest all the features noted above in independent claims 1 and 9. Moreover, after a detailed review of Goldick and Hoogerbrugge, the references fail to overcome the deficiencies noted above in D'Souza and Shibayama.

Accordingly, D'Souza and Shibayama in combination with Goldick or Hoogerbrugge would not result in, or otherwise render obvious, independent claims 1 and 9, from which claims 6, 7, 13 and 14 respectively depend. Therefore, claims 6, 7, 13 and 14 are not anticipated or rendered

obvious by D'Souza and Shibayama in view of Goldick or Hoogerbrugge for at least the reasons noted above.

Based on the foregoing, the Applicants respectfully submit that all the pending claims are patentable over the prior art of record. Thus, the Applicants respectfully request that the Examiner withdraw the rejections presented in the Office Action dated January 16, 2008, and pass the application to issue. The Examiner is invited to contact the undersigned attorney by telephone to resolve any remaining issues.

Respectfully submitted,

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